OIL-FREE PROCESS GAS COMPRESSORS – API 618

HX/HN Series (up to 560 kW / 750 hp)



Atlas Copco



THE BEST RESPONSE TO YOUR FLEXIBILITY AND RELIABILITY NEEDS

Atlas Copco is one of the world's leading companies in air/gas compression, with over 140 years of experience. Our complete range of solutions is characterized by outstanding product and component quality. We can handle a wide variety of gases and gas mixtures and can tailor our compressors to the specific requirements of your processes. If you are looking for a passionate manufacturer able to meet all your air/gas compression needs, look no further than Atlas Copco.





Ensuring reliable production

Designed for 24/7 industrial service, HX/HN compressors meet your requirements for a smooth and reliable supply of air or gas at all times, without the need for constant supervision. Proof of their reliability is the thousands of machines that have been operating worldwide for decades.

Preserving your process with oil-free technology

Oil-free compression safeguards the quality of the gas compressed. In most applications, even the slightest pollution is unacceptable and could lead to high risks for your production.

Maximizing savings

Reciprocating technology is a proven standard for high-pressure applications where low energy consumption is a must.
Adapted capacity control enhances the energy efficiency of these compressors. The integration of the latest innovations in terms of monitoring and control ranks HX/HN compressors extremely high for energy savings.







Energy

In all types of power plants, whether fuelled by nuclear, hydroelectricity, coal, biogas, wind or solar energy, our high-pressure compressors are used for multiple applications. These include supplying gas to turbines or cogeneration plants. Our numerous worldwide references are the testimony of the quality of our HX/HN machines.

Oil & gas

Whether onshore or offshore, thanks to reliable API 618 design and full customization to specific requests, HX/HN compressors work reliably in high temperature, sandy, corrosive and marine environments.

Chemical plants

The chemical industry is a major user of high-pressure compressors. Due to our expertise in numerous gases and our oil-free compression technology which preserves the process, our compressors are found in numerous applications in fertilizer plants, chemical units, rubber & plastics, and in CO_2 production and storage.

General industry

Whether for air separation units, the steel industry, the food & beverage industry, float glass, cable production, cleaning of pipelines or a multitude of general industry applications, the wide range of pressures and flow rates of HX/HN compressors make them the perfect fit either as standalone machines or in a complete solution. High-pressure oil-free compressors are also greatly appreciated for surge vessel applications, tests and laboratories, and in the aeronautics and defense industries.

OIL-FREE TECHNOLOGY: SAFE FOR YOUR PROCESS

Oil in your process can lead to severe consequences such as spoiled or unsafe products, production downtime, and legal issues. In the gas compression sector, gas integrity is of the utmost importance.

Atlas Copco technology guarantees oil-free production:

- Long- or double-distance pieces (depending on the process) equipped with oil sealing rings ensure physical separation between the crankcase and the cylinders.
- The length of the piston rod is calculated so that no part in contact with oil enters the compression chamber.
- Packings with sealing rings ensure tightness between the cylinder and distance piece.
- Piston rings and wear bands are made from PTFE.

Class Zero: A step forward in purity

ISO 8573-1 (2010) establishes a comprehensive classification and measurement methodology in which Class Zero represents the best possible air quality. HX/HN air compressors have been tested and certified by the TÜV and comply with Class Zero for air purity.

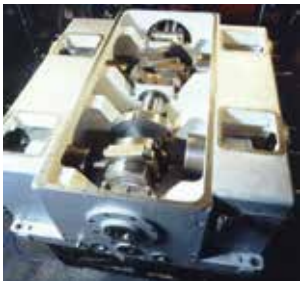
CLASS	Concentration total oil (aerosol, liquid, vapor) mg/m^3
0	**As specified by the equipment user or supplier and more stringent than class 1**
1	< 0.01
2	< 0.1
3	< 1
4	< 5

Current ISO 8573-1 (2010) classes (the five main classes and the associated maximum concentration in total oil content).



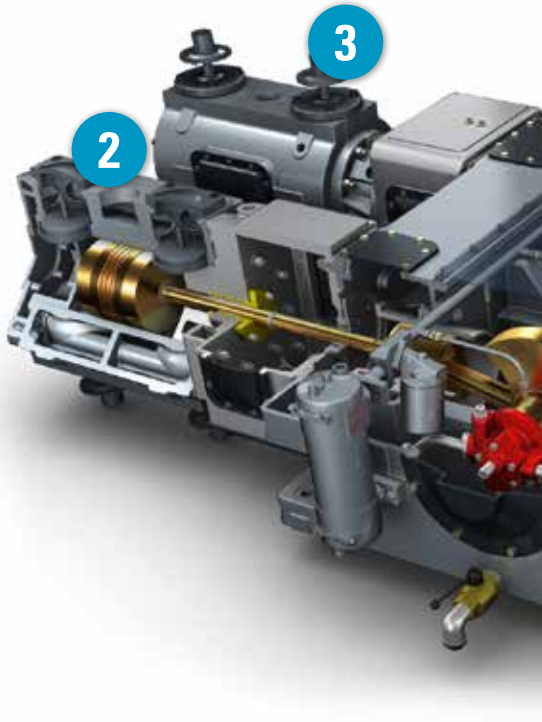
HIGHLY RELIABLE

Atlas Copco HX/HN compressors and boosters have proven reliability and ensure global 24/7 industrial service in the most difficult conditions. They are trusted by industry leaders all over the world.



1 Reliability due to superior design

- Heavy duty crankcase with forced feed lubrication for good lubrication allowing more load.
- Precise lubrication points on each bearing, extending bearing life time.
- Replaceable precision-bored sleeve bearings on the complete range for increased reliability and easy maintenance.
- Double bearing on crankshaft at flywheel side avoids crankshaft deformation & damage from over-tensioning of V-belts or heavy flywheel, increasing drive train reliability.
- Crankshaft made in ductile cast-iron (higher ranges: forged steel) to take more load, increasing reliability.





2 Safe cylinders

- Cooled by forced water circulation to minimize temperatures, increasing efficiency and reliability.
- For water saturated gases:
- Discharge valves at the bottom, in accordance with API 618.
- Non-accumulation of condensate for increased life time of piston rings.



3 Superior valve quality

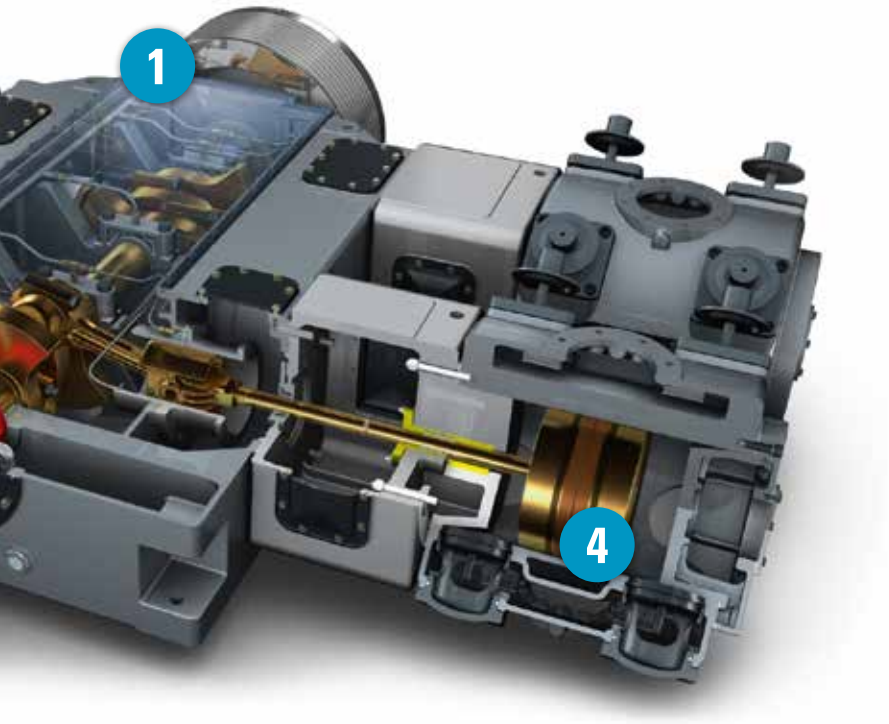
- Superior stainless steel valves, precise sizing and selection for each application for high efficiency and long lasting performance.
- Wide port area, ensuring minimal pressure loss.
- Customized discs (PEEK or stainless steel) for each application.
- Fail-safe type suction valves (unloading on air or nitrogen), when required by the process.



4 Reliable pistons and piston rods

- Pistons are made of composite aluminum, stainless steel or other materials according to the process.
- Piston rods in stainless steel or 42CD4 (hardened & tempered steel) with API 618 compliant hardness coating (induction or plasma) ensuring long life of packing rings.
- Piston is positively locked by Superbolt® on the piston rod: a highly secure tightening technology.
- Piston rings are made of composite PTFE for long life.





Adapted to gas composition

- Components (valves, piston rod packings, cylinders) are specially selected according to gas composition and humidity content.
- Specially adapted materials such as stainless steel pressure vessels and piping in case of wet gas for a reduced risk of corrosion.

Horizontal design for reduced maintenance

- Less vibrations for longer component life.
- Reduced forces and torques to minimize foundation requirement.
- Reduced specific load on piston wear bands for longer life.
- Easy access to all parts and easily removable crosshead guide.
- Skid mounted, plug & play compressor.

Long lasting performance due to low temperatures

- Low piston speeds and low revolution speeds for low temperatures.
- Lower gas temperatures ensure longer component life.
- Excellent cylinder cooling due to forced cool water circulation.

API 618

Atlas Copco HX/HN compressor technology is based on the requirements of API 618. These compressors offer a horizontal balanced design, moderate and low speeds and a low operating temperature for reliable operation over years. Our machines are equipped with long-distance pieces for oil-free compression and integrate easy access for maintenance. They are designed for long use (more than 20 years) and for long operating periods without major overhauls. Depending on your process, we can further customize your equipment to meet specific requirements (cylinder liners, double compartment distance pieces, oil consoles). Our engineers have extensive experience for such processes and we have numerous references of API 618 machines in the field.

SAVE ENERGY WITH SMART CAPACITY CONTROL

HX/HN piston compressors are extremely energy-efficient. Adapting the capacity to the gas or air requirements ensures that the process is as flexible and efficient as possible. Different types of capacity control are possible:

- **Stepped control** – Double-acting cylinders allow the flow to be adjusted by clamping one or several suction valves in the open position. Stepped capacity control of 0-100% or 0-50-100% is possible.
- **Bypass** –The use of a pressure control valve gives an extremely stable pressure.
- **Variable Speed Drive** - In single stage machines with double acting cylinders, Variable Speed Drive (VSD) capacity control allows the pressure to be finely tuned within a narrow pressure band.

Advanced control and monitoring

The Elektronikon® monitoring system ensures smart control of your compressor and saves energy.
Based on advanced technology, this intelligent system is extremely easy to use in daily operations and for programmed maintenance.

Easy management

A highly user-friendly screen (31 language settings possible):

- All operating parameters are displayed and can be customized to your site.
- Easy settings of start/stop, running hours, priority selection.
- Monitoring of running conditions and graphical indication of service plan.
- Regulates system pressure within a pre-defined narrow pressure.
- Integrated savings functions like dual pressure set point, four different programmable week schedules.



Safe control

- Warning and shutdown indications.
- Early detection of deviations allows preventive correction and protection against shutdowns.

Enhanced maintenance

- Service requirement and service plan notifications allow a clear follow-up of the machine.
- Historical records allow analyses and predictive operations.

CUSTOMIZING YOUR MACHINE

At Atlas Copco, we know that every customer has unique requirements. Every machine can therefore reflect the particular requirement of each customer. Whether in safe, harsh or hazardous areas, for installation indoors or outdoors, onshore or offshore, we can supply the equipment you need.



Adapted design

- Adaptation to gas composition and to your process.
- Stainless steel components and pipings.
- Specially designed separator for wet gas.
- Special paint or protective coating.
- Welding specifications.

Drive

- Electric motor – Diesel engine.
- V-belts up to 315 kW.
- Direct drive for higher power or on request.
- Reduction gear.

Electrical equipment

We adapt our equipment to your local requirements:

- Control and safety instrumentation.
- Control cabinets & starting cabinets.
- Redundant PLC.
- Soft starter.
- Different voltages.
- Nema 4 cubicle.

Adaptation to the environment

- Explosion-proof versions are available; compliance with hazardous areas.
- Air conditioned/pressurized cubicles.
- Non-essential marine approvals.
- Desert applications.

Range of customized options

- Vibration control/monitoring.
- Rod drop control.
- Special instrumentation.
- Oil heater and oil dual filter oil electrical pump
- Cylinder liners.

ADAPTING THE COMPRESSOR ENVIRONMENT

Compressor room concept

- Complete solutions in containers including dryer, receiver, cooling systems, lighting, ventilation.
- Containers adapted to the environment.

Customized packaging

- Skid-mounted compressors with connections at skid limits.
- Compressors in containers for specific requirements.
- Concrete baseplates on request.

Built to major international codes and standards

HX/HN compressors are designed and manufactured as per the major international standards: CE/PED, ASME, SQRL, GOST, IEC/CE, UL/CSA, ATEX Zones 2, 3 - PED module D & H, other codes or standards on request.



DEVELOPING COMPLETE SOLUTIONS

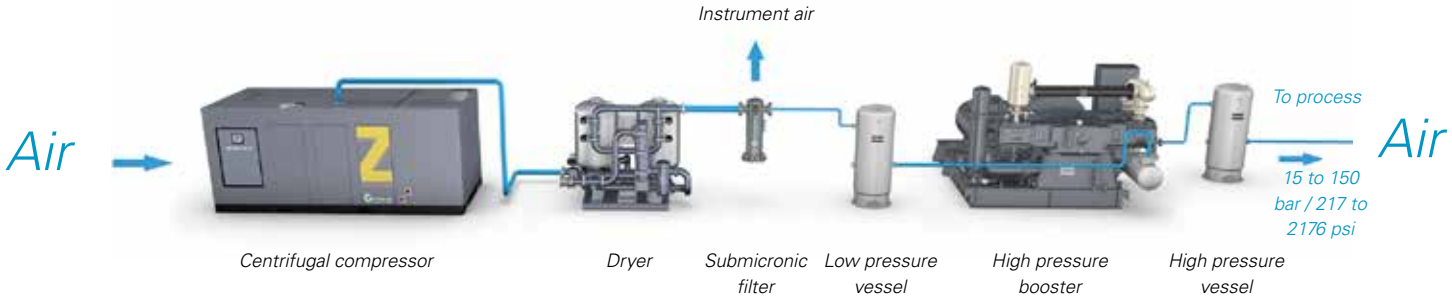
Thanks to an unmatched portfolio of technologies and equipment, Atlas Copco can provide complete solutions combining:

- Screw, centrifugal and reciprocating compressors.
- Nitrogen generators.
- Gas dehydration and purification units.
- Biogas upgrading equipment.
- Filters, dryers, pressure vessels, and air/gas treatment accessories.

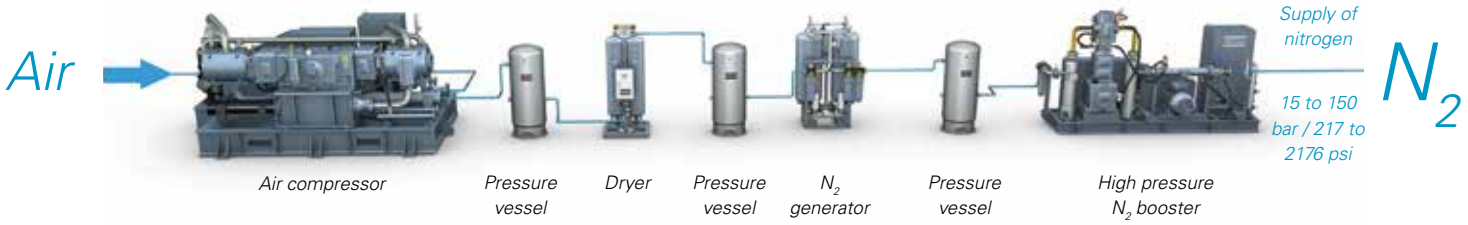
Our unique portfolio offers a range of benefits:

- Quick and safe sizing of all combined elements.
- Easy ordering and communication.
- Simple installation.
- Easier and cost-effective combined maintenance by our teams.

From atmospheric air to high pressure



From air to N_2



OUR PASSION: AIR & GAS COMPRESSION
OUR COMMITMENT: YOUR SATISFACTION

Since the creation of our company, designing innovative solutions to serve our customers in air and gas compression has always been our driver and passion. Our team of specialists will help you choose the most optimal solution for your process and will support you through all stages of your project.

Front-end engineering and design

Our engineers are highly trained specialists in every aspect of compression and have wide experience. They are backed up by applied calculation software. All thermodynamic data, the characteristics of the gas mixtures to be compressed as well as site conditions are taken into account. Our engineers calculate the machine, element by element, by stage, cylinder and effect. Preliminary general arrangement drawings can be provided on request at front-engineering level.

Contract handling: a specialist dedicated to you

At Atlas Copco, we focus on one goal: helping our customers through every stage of their project, from beginning to end.
Our dedicated specialists develop solutions to maximize your productivity over the long term. Our specialized contract engineers handle contracts right from the start and throughout production. Progress meetings are held as part of the certification to initiate procurement and manufacturing processes. Strict and regular follow-up is established. Thermodynamic studies are part of each project.

Driven by innovation

R&D is an ongoing process within Atlas Copco for the benefit of our customers and as a foundation for future growth. Components and materials are continuously optimized and the most recent technological evolutions are implemented when they add value for our customers. This results in energy-saving solutions, easier maintenance, longer life of internal components and the development of new products.



AN EPC APPROACH

Based on the wide experience we have built-up with EPC companies, we have developed pre-defined sub-assemblies with standardized high-quality elements. These include:

- A detailed technical offer.
- Standardized PLC.
- Welding procedures.
- Protective coatings.
- Standard procedures for tubing & pipings, heat tracing, cables & instrumentations.
- Pipings and instrumentation diagrams.
- Special documentation/hook-up instrumentation.
- Quality control plan.

These result in a quicker and easier process, leading to very reliable and cost-effective solutions.



QUALITY MANAGEMENT: AIMING AT EXCELLENCE

At Atlas Copco, quality is at the core of all our processes; a demanding requirement that ensures customer satisfaction in our products and services.

A SHEQ long-term commitment: certified and recognized

Our quality approach is confirmed by the following certifications: ISO 9001, ISO 14001 and OHSAS 18001. We care for quality and safety, not only for our people in our factory but also for our suppliers and for our customers by providing reliable equipment and ensuring safe, healthy and respectful behavior. Atlas Copco is listed as one of the top companies in its industry in the prestigious Dow Jones Sustainability index.

0 default in safety assembly

The safety aspects are part of the DNA of our company starting from the design phase up to the final use of the compressor. This safety knowledge is now integrated in the 0 default pillar of the new Agile Manufacturing process. A benefit of this advanced quality system, following the automotive VDI 2862 guidelines, is a risk ranking on potential assembly default, which foresees a specific tightening error proofing solution to ensure a 0 default in Safety assembly, and is proven by the edition of a new quality & safety certificate.

Testing laboratory

At Atlas Copco we devote great attention to testing. This is a major step in the manufacturing process that confirms our desire to deliver the best quality machines. Our test benches comply with the ISO 1217 standard and are approved by APAVE. All sensors are connected to a computerized measurement acquisition system, which processes the measurements and calculates the performance. Its software is particularly user-friendly, enabling your engineers and inspectors to clearly understand and follow the measurements.



IN THE FIELD

A worldwide presence

Our service engineers are available in more than 170 countries. This means we can offer service close to you, with easy dialogue in your own language, and immediate availability at minimal cost.

Specialists in gas compression

Regularly trained on our machines, our service engineers provide expert service. They can work with your own teams or within the frame of a global contract. We have specially trained teams for intervention on offshore platforms (BOSEIT/HUET certificates). Our service engineers ensure start-ups and post start-up support.

Genuine spare parts

We supply genuine spare parts that are the only guarantee of safety and preservation of the performance of your machines over the years. The 3D designs and specific literature supplied with each machine make it simple for you to organize maintenance and spare part ordering.



COMPRESSOR ROOM MANAGEMENT

Smart remote control

From simple monitoring to complete management of several compressors, Atlas Copco offers optimal, tailored service.

A clear vision for maximum productivity

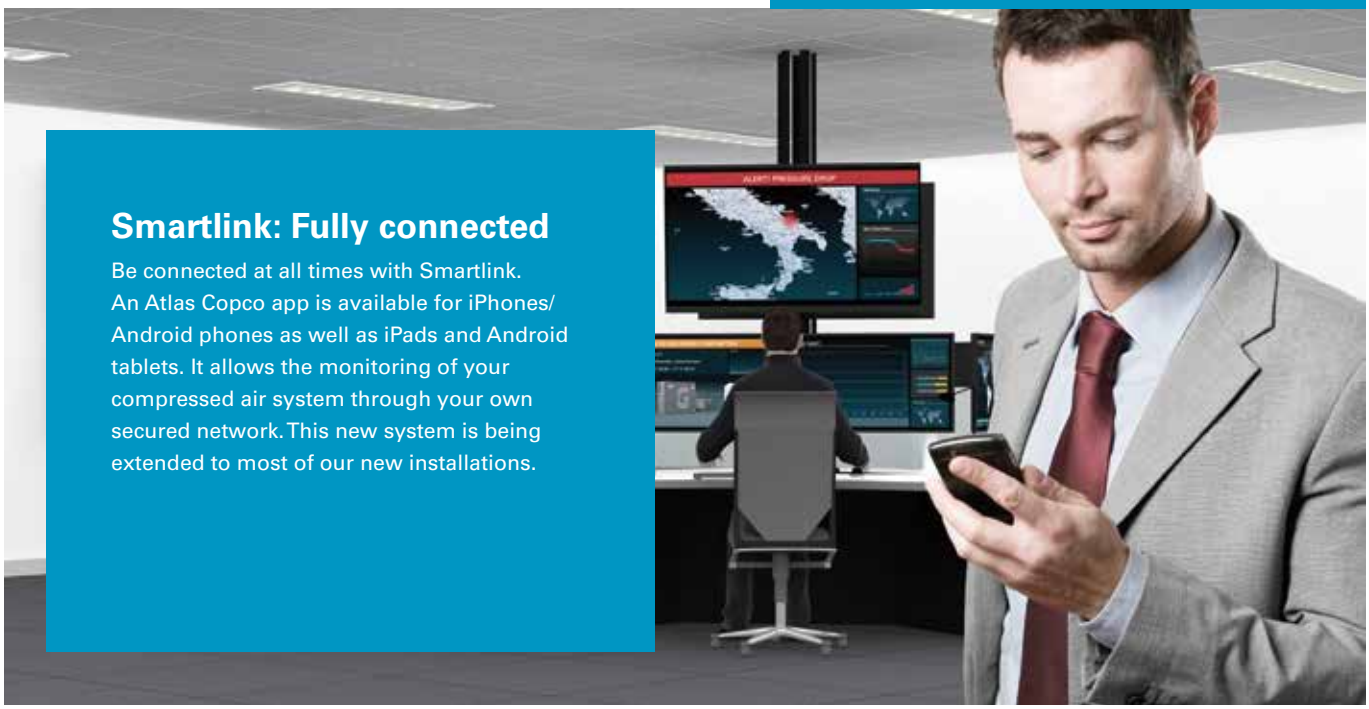
With our simply installed Combox (Modbus, Profibus, Ethernet connection), all data observable on the Elektronikon® monitoring system can instantly be visible in your plant's Distributed Control System. It allows you to supervise, anticipate and schedule maintenance, and manage working hours.

A step forward in energy saving

For a compressor room with several compressors, Atlas Copco has developed Energy Saving (ES) systems. They manage the machines based on demand. This allows for a smooth repartition of operation between different machines, saving energy and maintenance costs.







Smartlink: Fully connected

Be connected at all times with Smartlink. An Atlas Copco app is available for iPhones/ Android phones as well as iPads and Android tablets. It allows the monitoring of your compressed air system through your own secured network. This new system is being extended to most of our new installations.

A COMPRESSOR FOR EVERY APPLICATION



Methane compression
Fuel gas turbines

Compressor model: 1 EHN2 GT

- Gas compressed: natural gas.
- Single-stage compression.
- Capacity: 8500 to 11760 Nm³/h / 5003 to 6922 scfm.
- Inlet pressure: 25 to 32 bar(a) / 363 to 464 psia.
- Discharge pressure: 39 bar(a) / 566 psia.
- Power: 250 kW.



Natural gas compression
Gas storage/gas grid

Compressor model: 1 EHN4 GT

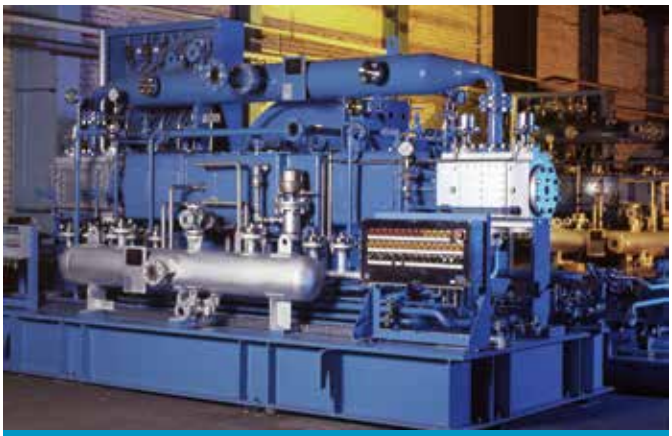
- Gas compressed: natural gas.
- Single-stage compression.
- Capacity: 4100 to 8300 Nm³/h / 2413 to 4885 scfm.
- Inlet pressure: 1.9 to 4.9 bar(a) / 28 to 71 psia.
- Discharge pressure: 3.2 to 13.1 bar(a) / 46 to 190 psia.
- Power: 440 kW.



Methane gas compression
Mixed gas/gas grid

Compressor model: 2 EHNX4 GT

- Gases compressed: methane, nitrogen, ethane, CO_2.
- Stainless steel intercoolers and aftercoolers (shell and tubes).
- Stainless steel pulsation damper at inlet and outlet of cylinders.
- Stainless steel flanged gas piping.
- Direct drive – flexible coupling.
- Capacity: 3500 to 5000 Nm³/h / 2060 to 2943 scfm.
- Inlet pressure: 1 to 1.8 bar(g) / 15 to 26 psig.
- Discharge pressure: 12 bar(g) / 174 psig.
- Power: 450 kW, 6000 V.



Hydrogen compression
Refinery

Compressor model: 1 EHN2 GT

- Gas compressed: hydrogen.
- Capacity: 13,150 Nm³/h / 7740 scfm.
- Inlet pressure: 24 bar / 350 psi.
- Discharge pressure: 57.2 bar / 830 psi.



Wet CO_2 compression
Chemical plant

Compressor model: 3 EHN4 GT

- Gas compressed: wet CO_2.
- 3 compression stages, four cylinders.
- Capacity: 1969 kg/h.
- Inlet pressure: 1.07 kg/cm² / 15.2 psia.
- Discharge pressure: 26.88 kg/cm² / 384 psia.



CO_2 compression
Fertilizer plant

Compressor model: 3 EHN4 GT

- Gases/fluids compressed: $C0_2$, H_2O, nitrogen, hydrogen and methane.
- 3 compression stages, horizontal lay-out, oil-free.
- Explosive area: classification Zone 2 – Group II BT3.
- Capacity: 2000 Nm³/h / 1177 scfm.
- Inlet pressure: 1 to 1.35 bar(a) / 15 to 20 psia.
- Discharge pressure: 29.5 bar(a) / 428 psia.



Process air compression
Solar energy industry

Compressor model: 1 EHX2T

- Gas compressed: air.
- Single-stage compression.
- Capacity: 1800 Nm³/h / 1059.4 scfm.
- Inlet pressure: 7 bar / 101.5 psi.
- Discharge pressure: 18 bar / 261 psi.



Process air compression
Air separation unit (ASU)

Compressor model: 2 EHNX4 GT

- Gas compressed: air.
- 4 compression stages.
- Capacity: 3000 m³/h / 1766 scfm.
- Inlet pressure: 7 bar / 102 psi.
- Discharge pressure: 70 bar / 1015 psi.



Air compression
Steel industry

Compressor model: 4 HN4T

- Gas compressed: air.
- Four compression stages.
- Cylinder liner on the fourth stage.
- ASME pressure vessel.
- Capacity: 1180 Nm³/h / 695 scfm.
- Inlet pressure: atmospheric.
- Discharge pressure: 69 bar(g) / 1001 psig.
- Motor: 250 kW – IP 56.



Nitrogen compression
ASU

Compressor model: 2 EHX2T

- Gas compressed: nitrogen
- Inlet pressure: 5.5 bar / 79.8 psig.
- Discharge pressure: 70 bar / 1015 psig.
- Capacity: 1000 m³/h / 589 scfm.



Air compression
Offshore platform

Compressor model: 2 EHX2T

- Gas compressed: dry air (-40°C / -40°F).
- For oil-free and dust-free air.
- Motor: Eex.
- IP 65 starting cabinet – DOL starter.
- Offshore installation.
- Ambient temperature: max. 48°C / 118.4°F.
- Installed in ventilated canopy.
- Capacity: 400 Nm³/h / 235 scfm.
- Inlet pressure: 4.7 bar(g) / 68 psig.
- Discharge pressure: 27 bar(g) / 392 psig.
- Power: 55 kW.



Air compression
Surge vessels

Compressor model: 4 HN 4T

- Gas compressed: air.
- 4-stage compressor.
- Oil-free air (air in contact with drinkable water)
- Capacity: 1500 Sm³/h / 883 scfm.
- Inlet pressure: atmospheric.
- Discharge pressure: 80 bar(g) / 1160 psig.
- High ambient temperature: max. 50°C / 122°F.
- Altitude: 1600 m / 5250 ft.
- Control panel for 2 units.
- Motor: 420 kW.



Nitrogen compression
Solar industry

Compressor models: 1 EXH1 GT

- Gas compressed: nitrogen.
- Package with two compressors on one skid.
- Inlet pressure: 12.5 bar / 181.3 psi.
- Discharge pressure: 40 bar / 580 psi.
- Capacity: 160 Nm^3/h / 94.2 scfm.
- Power: 22 kW.



High pressure air
Detergents

Compressor model: 4 HN2 GT

- Gas compressed: air.
- Capacity: 270 Nm^3/h / 159 scfm.
- Inlet pressure: atmospheric.
- Discharge pressure: 100 bar / 1450 psig.
- Motor: 90 kW.



Nitrogen compression
Refinery process

Compressor model: 2 EHN2 GT

- Gas compressed: nitrogen.
- Inlet pressure: 8.5 bar / 123.2 psi.
- Discharge pressure: 66 bar / 957.2 psi.
- Capacity: 1340 Nm^3/h / 789 cfm.
- Power: 160 kW.



Nitrogen compression
Steel plant

Compressor model: 2 EHN2 GT

- Gas compressed: nitrogen, dew point -60°C / -76°F.
- Capacity: 2000 Nm^3/h / 1177 scfm.
- Inlet pressure: 3 bar(g) / 44 psig.
- Discharge pressure: 25 bar(g) / 363 psig.
- Power: 220 kW.

FULLY CUSTOMIZED SOLUTIONS OPTIMIZED TO YOUR NEEDS

Based on three frame sizes, a range of more than 50 cylinders and different revolution speeds and piston strokes, Atlas Copco engineers will provide the best solution to your needs.

Technology

Based on API 618.

Capacities

Between 130 and 14000 Nm^3/h / 76.5 to 3240 scfm.

Inlet pressures

From 0.035 to 50 bar(g) / 0.0508 to 725 psig.

Discharge pressures

Depending on type of gas compressed:

- Air & nitrogen: up to 150 bar(g) / 2175 psig.
- Argon, methane, biomethane: up to 100 bar(g) / 1450 psig.
- Hydrogen, CO: up to 80 bar(g) / 1160 psig.
- CO_2: up to 60 bar(g) / 870 psig.
- Gas mixtures: depend on gas composition (H_2S content up to acceptable level).

Pressure ratios

Minimum 1.2 / Maximum 5 (depending on gases).

Number of stages

1 to 4.

Dew point

HX/HN compressors and boosters are adapted with the following conditions: water saturation to -200°C / -328°F for N_2 and -80°C / -112°F for other gases.

Power

From 30 to 560 kW / 40 to 750 hp

Revolution speeds

400 to 1000 rpm.

Frame	Max. power	Max. rod loading	Strokes	Connecting rods	Min./Max. speed	Max. cylinder bore
	kW	daN	mm		rpm	mm
HX1/XH1	55	2500	120/130	1	400/750	310
HX2	110	2500	120/130	2	400/1000	310
HN1	140	5500	120/160	1	400/750	560
HN2	280	5500	120/160	2	400/1000	560
HN4	500	5500	120/160	4	400/750	560
HNX1	157	6200	120/160	1	400/750	560
HNX2	315	6800	120/160	2	400/1000	560
HNX4	580	6200	120/160	4	400/750	560

COMMITTED TO SUSTAINABLE PRODUCTIVITY

We stand by our responsibilities towards our customers, towards the environment and the people around us. We make performance stand the test of time. This is what we call – Sustainable Productivity.

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